Raven Monitoring, Management, and Control Plan

Nursery Products Hawes Composting Facility

Prepared by:

Chris Seney, P.E.

Nursery Products
Suite 131
12277 Apple Valley Road
Apple Valley, California 92308

July 8, 2011

Table of Contents

1.0 Introduction

This section introduces the project background, purpose, objectives, and conditions of concern related to raven monitoring, management, and control in the vicinity of the Nursery Products Hawes Composting Facility (HCF).

1.1 Background

The Project is a biosolids and green material composting facility proposed on 80 acres of a 160-acre parcel located within an unincorporated area of the County of San Bernardino (County), California. The facility would recycle biosolids and green material to produce Class A compost. The green materials that will be employed are any plant material that is separated at the point of generation and includes, untreated wood wastes, natural fiber products, and construction and demolition wood waste; yard trimmings that might contain any food-like materials will not be used. Biosolids are solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Biosolids include, but are not limited to, treated domestic septage and scum or solids removed in primary, secondary, or advanced wastewater treatment processes and meet the acceptance criteria for the HCF (URS, 2006).

The Project is CEQA approved and an Incidental Take Permit (ITP) has been issued by the California Department of Fish and Game for the operation of the composting facility at a site that is located west of the City of Barstow, approximately eight miles west of Hinkley, and approximately 12.3 miles east of Kramer Junction. The HCF site is approximately one mile south of State Route 58 and one mile west of Helendale Road. HCF will be located on land owned by Nursery Products, near the abandoned Hawes Airport. The San Bernardino County Assessor's Parcel Number for the HCF site is 0492-021-24-0000, and the site is located within the southeast quarter of Section 36 in Township 10N, Range 5W, San Bernardino Base and Meridian (USGS Twelve Gauge Lake Quadrangle Map). The 80-acre property is roughly square in shape.

The operations and activities at HCF have the potential to indirectly impact populations of the desert tortoise (*Gopherus agassizii* [DT]), listed as threatened under the federal Endangered Species Act (ESA) and California ESA (CESA), were they to increase the attraction of common ravens (*Corvus corax* [raven]) into the area which could thereby increase the potential for DT depredation by ravens.

This Raven Management Plan applies to the 80 acre HCF and the access road covered by the Right of Way Permit issued by Bureau of Land Management (BLM). The term site as used in this plan refers primarily to the actual HCF but may occasionally refer to the HCF site and the road which together constitute the project.

1.2 Purpose and Objectives

The purpose of this plan is to identify the conditions of concern specific to the HCF that may attract ravens to the area and to define a monitoring, management, and control plan that will 1) monitor raven activity and 2) specify management and control measures that will avoid, minimize, or mitigate impacts to DT. The monitoring effort is intended to provide qualitative data that can be interpreted by a biologist to determine if Project Design Features (PDFs) are working or if additional management and control measures are needed to mitigate impacts to DTs. For this purpose, Nursery Products will designate an Environmental Compliance Monitor (ECM) for the monitoring and control of raven activity at the project site.

Specific plan objectives include:

1. Clearly identify how PDFs will be utilized to manage the conditions of concern specific to the Project that may attract ravens to the area;

2. Document the effectiveness of PDFs in addition to raven management and control measures implemented at the project site;

3. Specify how and when mitigation measures for DT would be selected and implemented if the raven monitoring suggests the need for additional controls; and

4. Define triggers for modification of raven management and control measures.

1.3 Conditions of Concern

The conditions of concern are those features or activities that, when not properly managed, provide new raven attractors (such as sources of food, water, or nesting habitat) that may result in changes in raven population or behavior that could potentially adversely affect the DT population in the HCF area. Five potential conditions of concern have been identified for the Project and have been considered in developing this plan:

1. Water in retention ponds as an attractant of ravens;

2. Potential creation of new raven perching/roosting/nesting sites;

3. Water ponding potential due to dust suppression technique;

4. Solid waste management during construction/operation; and

5. Compost piles/windrows.

Raven monitoring as well as measures for raven management and control, are dependent upon the accuracy of defining these five conditions of concern. Each of these conditions of concern is defined in more detail below.

Retention Ponds

The HCF includes two retention ponds that will collect storm water from the composting area. The two retention ponds are required under the Regional Water Quality Control Board (RWQCB) permit and will have an approximate capacity of 17 acre-feet. The HCF site normally receives only approximately 4.5 inches of rain per year and therefore it is not anticipated that water will accumulate in the retention ponds frequently. The addition of any new water source to an area where water sources are generally sparse may result in the attraction of ravens to the site. In response to this issue, after rain events the two retention ponds will be emptied by onsite personnel and the water will be used promptly onsite for dust control. Removing any standing water will reduce the attraction of ravens. The water in the retention ponds will be of low quality as it will consist of storm water collected from site runoff and may be mixed with compost. The retention ponds will be emptied following each rain event that deposits water into these ponds. The ponds shall be the first source of water used for dust control following each rain event to ensure that it is not left standing any longer than absolutely necessary. The water in these ponds is required to be used, to reduce HCF's dependence on other sources of water, and the ponds shall be operated in accordance with the water quality permit which requires that any water in the ponds be used as the first water source for on-site usage, primarily dust control when water is present in the ponds and in no event shall the water remain in the ponds longer than 30 days.

Perching, Roosting, and Nesting Sites

The majority of raven predation on DT is thought to take place during the spring, most likely by breeding birds that have been shown to spend most of their time foraging close to their nests. Therefore, structures that facilitate nesting in areas ravens could not otherwise nest in may pose a danger to nearby DT

populations. The majority of the HCF site will not contain structures that could be utilized by ravens for nesting. The only onsite structure will be an office trailer. Perching locations will be limited primarily to the outer fencing.

Ponding

There will not be any ponding water at the HCF as the site is graded for storm water collection purposes. Water may on occasion be applied to minimize dust emissions. Extremely short term ponding of water could result from the dust suppression activities although the rate of application has been designed to minimize this possibility. Any such ponding may have the potential to attract ravens, thereby potentially resulting in increased DT predation by ravens.

Management

Ravens are considered scavengers that obtain a high percentage of their diet from human generated food sources such as landfills, dumpsters, open garbage drums, and road kill (Boarman, 1999). Both the construction and operation at the HCF would result in increased solid waste generation from human lunch or other activities. Any such solid waste if improperly managed could attract ravens.

Compost

The compost piles/windrows consist of tertiary-treated biosolids and green material, almost exclusively previously separated woody material, and not food materials. Since neither these green materials nor the biosolids provide suitable food for ravens, ravens are not likely to be attracted to the compost windrows (Berg, 1999). Windrows are therefore not anticipated to be an attractant to ravens as they do not in themselves provide a food source. In addition, windrows must be maintained at 131° F for fifteen days and most insects are not attracted to materials at that temperature. The biosolids must be emplaced in windrows within two hours of receipt at the HCF (and will generally be immediately placed in windrows) and the windrows reach the 131° F within about twelve hours of emplacement. While the composting material may theoretically attract insects and isopods that could be considered to be a suitable food source for ravens, however, the above factors and past practice at similar facilities has not shown that insects are attracted.

2.0 Incidental Take Permit

An Incidental Take Permit (ITP) was issued by California Department of Fish and Game (CDFG) to Nursery Products on November 22, 2010. The ITP for Nursery Products is 2081-2008-017-06. This plan will serve to meet a requirement of that ITP and requirements of the USFWS.

3.0 Management Practices

This section specifies management practices or PDFs to be implemented by Nursery Products to minimize the potential for the HCF to attract ravens. These management practices are based on *Reducing Predation by Common Ravens on Desert Tortoises in the Mojave and Colorado Deserts* prepared for the Bureau of Land Management (BLM) by the U.S. Geological Survey (USGS) (Boarman, 2002). Conditions of concern identified in Section 1.3 have been grouped into construction and/or post construction (operation) phase conditions, as appropriate for the HCF. Construction phase conditions are considered temporary and are anticipated to be avoided or minimized mainly by the implementation of management measures as defined in Section 3.1 below. Operation conditions will include management measures to minimize potential impacts and may require additional control measures based on the results of the monitoring program.

3.1 Construction

Construction-phase impacts are considered more temporary in nature than post construction impacts and would therefore require temporary management practices to avoid or minimize the potential to attract ravens to the project. Construction-phase conditions of concern for the HCF include ponding water and waste management.

3.1.1 Ponding Water

To minimize the occurrence of ponding water, the application rates of water for dust suppression activities will be predetermined to minimize excessive application. In addition, as required by the Water Board permit, the HCF design includes a grading for run off control and does not include low areas where water might pond. The application rate should consider soil infiltration and evaporation rates. The ECM will patrol areas to ensure water does not pond for extended periods and make recommendations for reduced water application rates where necessary.

3.1.2 Solid Waste Management

Trash and food items, primarily from construction workers, will be contained in closed, secured containers and removed weekly to reduce the attractiveness of these items to opportunistic predators such as ravens. In addition, a required Worker Environmental Awareness Program which includes a discussion of the adverse impacts of creating raven attractants (waste and water ponding, etc.) will assist in ensuring that no trash is available that might attract DT predators. Also, facility personnel will be directed not to feed wildlife on site as part of the environmental awareness training.

3.2 Operation

Operation-phase impacts are considered ongoing impacts and would therefore require PDFs and ongoing management practices to avoid or minimize the potential to attract ravens to the HCF site. Operation-phase conditions of concern for the HCF include water in the retention ponds, perching sites, and solid waste management. The compost piles/windrows will not attract ravens as they do not provide a food source.

3.2.1 Water in Retention Ponds

PDFs to deter use of the ponds by ravens include pond design features that will make the pond water less accessible to ravens (e.g., steep pond sides, at least two feet of freeboard, and perimeter protection). In addition, reducing other potential site attractants will assist in reducing the overall attractiveness of the HCF to ravens. The retention ponds are required for storm water collection; no other water will accumulate in the ponds. Because the ponds are for storm water runoff, it is not likely that they will contain water on a regular, on-going basis, but rather only after a storm event of sufficient size or duration to cause storm water runoff. Such events will typically occur when other temporary water sources are available to ravens.

The retention ponds would be located approximately 40 feet inside of the perimeter fence, thus minimizing any visual cues to terrestrial wildlife species that a source of water is present within the HCF. Because the ponds need to remain uncovered to maximize evaporation rates, a series of deterrence measures are being incorporated into the design and operation of the retention ponds that would minimize access to the ponds by ravens. The operational design of the ponds includes a minimum freeboard of two feet so ravens cannot reach the water from the perimeter. In addition, the interior sides of the ponds would be at a slope which is considered too steep for birds to walk down. Due to the relatively steep sides of the ponds, ravens will be unable to access any water unless it is just a few inches deep – i.e. only available at a depth where ravens could wade in the ponds. Thus there would be a very narrow window when any water would be accessible – significantly less than the 30-days water

permit limit. The ponds will be monitored bi-monthly during the site monitoring (see Section 4.3.1) and corrective action (see Section 5) will be implemented if ravens are being attracted to any standing water. Other options to be considered, if necessary based on bi-monthly site monitoring (see Section 4.3.1) results, include the use of antiperching devices, such as "Bird-B-Gone" and "WhirlyBird," placed strategically along the perimeter of the ponds to exclude ravens and other birds from accessing the edge of the ponds to drink water. These design features would make it difficult for perching birds (e.g., ravens) and/or shorebirds to access the water. With two retention ponds available, each pond can be prepared with a different configuration of deterrents to determine the most effective combination (i.e., the first pond with only Bird-B-Gone and the second pond with only WhirlyBird). The HCF's ECM would be responsible for making qualitative observations on the relative success of the deterrent(s) at each pond and providing recommendations for future improvements. Water collected in the ponds retained following rain events in these ponds will be the first water source used for dust control. This ongoing requirement will minimize the time when water is left standing in these ponds. In any case, water will not remain in the ponds for more than 30 days as required by the Water Board permit. During dry periods the bottom of the pond shall be checked to ensure that it is as level as feasible so as to minimize the ponding from the uneven nature of the bottom as the water in the pond is withdrawn and used. The bird deterrent devices shall be particularly important during the final stages of draw downs this will be the only time due to the steep side construction that landing birds to drink water will be possible. Therefore, the ECM shall monitor the first several draw downs of the pond and shall work with the site operator to identify methods and approaches that will minimize the period of possible use by ravens and to ensure the effectiveness of the bird deterrent measures during these periods.

3.2.2 Perching, Roosting, and Nesting Sites

PDFs would be implemented to avoid introducing new raven perching, roosting, and/or nesting sites on the office trailer – the only known potential perching location onsite. Potential PDFs that would be considered to reduce the attractiveness of HCF components to ravens primarily include the use of physical bird deterrents such as bird spikes, Bird-B-Gones, and WhirlyBirds. In addition, nest removal would occur in conjunction with monitoring, as discussed below.

The majority of raven predation on DT most likely occurs in the spring (Boarman, 2002). As such, the removal of unoccupied or partially constructed raven nests prior to utilization for egg laying, shall be utilized to control DT predation. Nests will be removed only from within the HCF site. If nests are observed on adjacent lands, the BLM, CDFG, and USFWS will be notified. The goal of these measures is solely to avoid raven nesting to maximize protection of DT. These activities shall be done in such a manner as to avoid impacts to nesting birds by removing partially constructed nests or nesting material before egg laying occurs, which will jointly ensure no violation of other laws or regulations. To this end, the ECM will monitor for nesting activity within the HCF site or at the site of the office trailer during the nesting season (approximately February 15th through September 15th) and shall ensure appropriate removal of any partially constructed nests before they are utilized.

3.2.3 Solid Waste Management

The trash abatement program developed for the construction phase will also include operation-phase measures to be implemented for the life of the Project. The only trash or food items will be those introduced by employees, all of whom will have taken DT environmental awareness training. Additionally, trash and food items will be contained in closed, secured containers and removed weekly to reduce the attractiveness to opportunistic predators such as ravens. The ECM will continue to ensure that these practices are enforced and make recommendations for improvements where applicable.

3.2.4 Composting Piles/Windrows

As stated above in Section 1.3, and from a full review of the available literature on the eating habits of ravens, it is not anticipated that the windrows themselves will function as a food source. The windrows do not contain the typical food items that attract ravens. To further reduce raven attraction to the windrows,

insects will be managed through a licensed contract pest control company (PBS&J, 2009) if determined necessary based on the bi-monthly monitoring results. The EMC shall monitor the windrows during the early part of their operations to ensure that this is in fact the case. In the unlikely event that the windrows should begin to become an attractant to ravens the ECM shall work with the operations staff at the site to immediately implement measures to prevent raven attraction. Such measures, if ever needed, shall include, but not be limited to those identified in Section 5 below.

4.0 Monitoring Practices

Raven monitoring will be implemented in the construction and post construction (operations) phases of the HCF. The monitoring program is designed as an observational reconnaissance level study aimed at monitoring the effectiveness of the PDFs and management measures implemented with the goal of avoiding new subsidies for ravens HCF and evaluating the overall effects of the HCF and specific components (i.e., retention ponds) on the raven population (e.g., activity or presence).

4.1 Construction Phase

To identify potential increases in raven activity, the ECM will conduct bi-monthly (i.e., approximately every other week) reconnaissance level surveys in the HCF site. Surveys will focus on all potential raven attractors including solid waste disposal areas, structures, and staging areas where large equipment or material may be stored, and any area where water is applied to control dust. Data will be recorded for each raven observed including: bird activity, which will be categorized as flying, perched, or on the ground (likely scavenging); type of perch (if applicable); and the general location of the bird within the project site. In addition, any new nesting locations will be recorded and all nests will be removed prior to the nests being occupied by birds.

4.2 Baseline Data Collection

A baseline survey will be conducted by a qualified biologist prior to the initiation of construction activities. The baseline survey will include data on the abundance and behavior of the common raven on the HCF site and along the access road prior to construction. The baseline survey will form the basis for determining significant changes in raven behavior and/or abundance which would trigger future raven management needs. The survey will also provide a basis for measuring the success of PDF actions taken. The baseline data collection will consist of morning, mid-day, and evening raven counts one day a week for two weeks prior to the initiation of construction.

4.3 Operation Phase

To identify any potential increases in raven activity during the operation-phase, the ECM will conduct bimonthly (i.e., approximately every other week) reconnaissance level monitoring at the HCF for the life of the project.

4.3.1 Ongoing Bimonthly Raven Monitoring (life of project)

The ECM will conduct bi-monthly surveys for raven activity at pre-designated locations to ensure consistency of observations over time. These surveys will begin when the HCF is operational and will continue every two weeks (bi-monthly) for the life of the project. Survey locations will focus on HCF components that may influence raven abundance, activity, and behavior by potentially allowing perching, roosting, and nesting opportunities or by providing raven attractors such as food and water. HCF components that will be monitored include the office trailer, retention ponds, windrows, and solid waste disposal facilities. An appropriate number of permanent monitoring locations (not to exceed 10 in number) shall be established to ensure that all areas of possible concern are observed throughout the HCF. These

monitoring locations will be based on areas that have the greatest likelihood of attracting ravens. A 5-minute sampling session will be spent at each monitoring location for active observation and listening for the presence of ravens within the HCF site. The ECM will record raven detections and will document the behavior of the raven (i.e., perched, flying, on the ground, nesting, etc.), perch type (if applicable), and distance and direction from the monitoring location. Additional data collected will include the survey start/stop time, and weather (including temperature, average wind speed, and percent cloud cover). In addition, the location of any nests detected during a survey will be noted and recorded immediately following the conclusion of the sampling session. Information from the pre project construction shall help to identify the timing of the ongoing raven monitoring activities.

To aid the ECM and ensure consistency throughout the duration of the project's life, a data sheet will be prepared in advance outlining the required data to be collected. Surveys should not be conducted when wind or rain interferes with audible detection or rain interferes with visual detection, or when unusual weather events may affect raven behavior. In addition to raven monitoring, the ECM will document the occurrence and type of road kill within the HCF site and along the access road. If road kill is observed, special attention shall be given to the presence and behavior of ravens in the immediate vicinity.

The actual use of windrows by ravens or the presence of raven activity on/near the windrows, if any, shall be noted and if necessary recommendations on measures to be implemented to deter such use shall be made accordingly.

5.0 Control and Adaptive Management Practices

If the results of the monitoring efforts suggest that there is a substantial and sustained (i.e., consecutive years) increase in raven activity that may result in DT predation, even with the implementation of PDFs and operational measures as defined in Section 3.0, then Nursery Products may need to implement additional mitigation measures to further control or deter ravens at the HCF site. This section defines the types of control practices that may be implemented if additional mitigation is determined to be necessary. Prior to the implementation of any control measure, the ECM and, if needed, an approved DT Biologist along with Nursery Products would coordinate the discussion and approval of control measures with the appropriate resource agency representatives.

5.1 Road Kill Removal

Ravens are scavengers and are well known for eating animals that have been killed along roads and highways, which are often abundant in the desert region. The ECM will document the occurrence of road kill during the bi-monthly raven monitoring events. Monitoring of road kill will focus on the project site and nearby paved and dirt roads. If road kill occurs frequently at the HCF or along the access road, and if ravens are commonly noted feeding on that road kill, it may be appropriate for Nursery Products to implement a road kill removal program. Details of a road kill removal program would be designed by the ECM in coordination with a DT Biologist and BLM, DFG and USFWS. Nursery Products will not monitor road kill on State Route 58 or on Helendale Road but the access road will be included in the area covered by the bi-monthly monitoring efforts.

5.2 Hazing

If raven numbers at the HCF show signs of significant increase above the baseline survey results even with implementation of the PDFs described above, hazing of ravens can be considered as a method of deterrence. Hazing can include any number of devices designed to scare birds; hazing can include either visual and auditory devices, or combinations of the two. Hazing is commonly used by farmers to dissuade birds from eating recently planted crops or on airfields to prevent birds from amassing near runways.

The most appropriate form of hazing technique that may be utilized by the HCF would be an air cannon that would frighten birds away from the retention ponds or other areas of concern. If deemed appropriate,

a hazing program would be designed by the ECM in coordination with a DT Biologist and the CDFG, BLM or FWS. Permission may also be required from the local police or municipality, to ensure compliance with any local ordinances that for example prohibit the creation of loud noises.

5.3 Methyl Anthranilate

If raven numbers increase significantly or remain significantly elevated, chemical deterrence methods may be employed. Methyl Anthranilate (MA) is a naturally occurring GRAS-listed (generally recognized as safe) compound used as a food flavoring and fragrance additive. When applied as a formulated spray, MA has been found to be effective in repelling birds from feeding on crops such as cherries, blueberries, and grapes (Umeda, 2001). Prior to the use of MA at the project site, research into the most current application of MA to deter raven activity should be conducted by a biologist and then methods to apply this technique as a raven deterrent could be designed in coordination with the ECM and the BLM, CDFG, and USFWS.

5.4 Lethal Removal

If ravens are attracted to the HCF site even after the implementation of PDFs, modification to PDFs, and implementation of the above control measures, it may be necessary to consider lethal removal.

There is no evidence that lethal removal will have a long-lasting effect on raven population levels, raven foraging behavior, or survival of juvenile DT. Under this control method, targeted ravens would be shot by rifle or shotgun. Young ravens found in nests of removed adults need to be euthanized humanely if they can be captured safely. This technique would be considered as a last resort to eradicate ravens from occupying the site. A biologist and the appropriate resource agencies will be consulted prior to any lethal removal of ravens to ensure consistency with all applicable State and Federal laws.

5.5 Procedures for Implementing Adaptive Management Practices

Adaptive management activities will be monitored and evaluated for their efficacy during the bimonthly site evaluations by the ECM. Evaluation of raven management practices will be evaluated in light of temporal and seasonal variations in raven behavior and numbers, locations, any observed preferences for areas of the site or road. Observations and results of PDFs and any additional management activities will be recorded by the ECM and included in the bi-monthly evaluations in order to inform future decisions relative to any additional adaptive management measures for ravens. The ECM shall recommend any additional measure which may be warranted and measures shall be sequentially escalated and evaluated.

6.0 Reporting

The ECM will prepare a report summarizing the results of the bi-monthly monitoring events and describing any noted raven activity in the HCF site. The report shall include but is not limited to results from the annual monitoring, a discussion on raven observations in relation to PDFs and their efficacy, locations of any observed raven nest sites, roadkill observations, and recommendations for adaptive management, if needed. The results of this monitoring shall be made available to BLM, DFG and USFWS to facilitate a better understanding of actual use patterns by ravens of the HCF and the effectiveness of measures designed to discourage such use. These report shall be made available quarterly for the first full year of operation and unless the first year's reports warrant otherwise, annually thereafter. These reports along with the baseline survey results shall be used as the longer term record to evaluate any recommended additional raven management measures.

7.0 References

Berg, R. and T. Dewey. 1999. "Corvus corax" (On-line), Animal Diversity Web. Accessed January 27, 2011 http://animaldiversity.ummz.umich.edu/site/accounts/information/Corvus_corax.html.

Boarman, W. and B. Heinrich. 1999. *Corvus corax*: Common Raven. *The Birds of North America*, 476: 1-32.

Boarman, William I. 2002. Reducing Predation by Common Ravens on Desert Tortoises in the Mojave and Colorado Deserts. Prepared for the Bureau of Land Management (BLM) by the U.S. Geological Survey (USGS), Western Ecological Center.

PBS&J. 2009. Final Supplemental Environmental Impact Report for Nursery Products LLC's Hawes Composting Facility. Prepared for the County of San Bernardino. State Clearinghouse number 2006051021. November, 2009.

Umeda, K. and L. Sullivan. 2001. *Evaluation of Methyl Anthranilate for Use as a Bird Repellent in Selected Crops* (On-line). University of Arizona College of Agriculture 2001 Vegetable Report. Accessed January 27, 2011 http://ag.arizona.edu/pubs/crops/az1252/.

URS. 2006. Draft Environmental Impact Report for Nursery Products Hawes Composting Facility. Prepared for the County of San Bernardino. September, 2006.